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PREVENTION & REHABILITATION

Exercise intention, age and stress predict increased qigong exercise adherence

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Summary Adherence to exercise is paramount if desired health effects are to be achieved. Drop-out rates in excess of 50% have been reported, with the intensity of the exercise performed frequently blamed. Qigong is a low-intensity mind–body technique that may offer an alternative to more intense modes of exercise. The aim of this study was therefore, to determine if exercise motives, exercise intention, age, stress and energy levels predict adherence to qigong exercise. Participants ($n = 87$) were assessed by self-rated retrospective physical activity behavior, by performed qigong exercise and concentration level, and by sport motivation scale, planned behavior questionnaire, and stress and energy scale. Exercise intention, age and stress predicted exercise frequency ($R^2 = .29$); when level of concentration (a non-baseline assessment) was included as a predictor, prediction strength increased ($R^2 = .38$). Results suggest that health-professionals who are aiming to secure activity adherence and exercise frequency, should focus on strengthening the individual's intention to exercise, promoting a calm energy state before commencement of exercise, and encouraging a heightened level of concentration during exercise.

Introduction

Regular physical activity is an important factor in the prevention of illness and promotion of physical and mental wellbeing (US Department of Health and Human Services, 2000). Encouraged by supportive research, a large number of people initiate a physical exercise regimen, but the drop-out rate within the first few months frequently exceeds 50% (Dishman and Buckworth, 1997). This can, at least partly, be explained by exercise intensity. It has been found that exercise adherence is negatively associated with exercise intensity, and that high-intensity programs should be avoided when adherence is crucial (American College of Sports Medicine, 2000). The American College of Sports

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Medicine (2006) has later suggested that "walking may be the activity of choice for many individuals because it is readily accessible, offers tolerable exercise intensity, and is an easily regulated exercise for improving health outcomes and [cardio respiratory] fitness" (p. 140). Empirical research has also found that walking is associated with higher adherence than other more demanding activities (Lamb et al., 2002).

Although walking may be the preferred choice of many (Parkkari et al., 2000), there are a number of reasons why it is not the ideal activity for everyone. Reasons that easily come to mind are related to climate and safety. Both younger and older people may find it difficult to exercise in winter when darkness prevails and the underfoot conditions may become unsuitable due to rain, or even snow and ice in some countries. In addition, many people avoid exercising outdoors because of the risk of being attacked or subjected to hazards such as heat-exposure (Sit et al., 2008).

Consequently, low-intensity physical activities other than walking may be worthwhile exploring. Some health-professionals regularly prescribe mind–body exercises, such as tai chi, qigong, yoga, and Pilates as alternatives to vigorous exercise (Cowen and Adams, 2005; Mills et al., 2000; Muscolino and Cipriani, 2004). These types of activities are usually performed in safe surroundings, either alone or together with others. However, few studies have investigated these mind–body techniques from an exercise-adherence perspective.

The purpose of this study is therefore, to follow a group of qigong exercisers over time to see whether they adhere to their exercise regimen according to their exercise intentions. Qigong as a regularly performed exercise has shown multifaceted health benefits (Jouper et al., 2006; Lee et al., 2003), including reduction of stress-related symptoms (Lee et al., 2004, 2000). Qigong is a low-impact movement or static meditation therapy performed with deep concentration on the movements or qi-flow in the body (Fan, 2000). It is part of traditional Chinese medicine, a tenet of which is that illness can be both prevented and treated by strengthening qi (Cohen, 1997; Sancier, 1996; Tang, 1994), where "qi" relates to life-energy (life-force) and "gong" to work or skill. Qi can be manipulated physically (acupuncture, acupressure, and massage), chemically (herbs, foods, and liquid) and mentally by mind focusing (qigong exercise). Qigong exercise performed with a deep concentration on qi-flow has been linked to health improvements (Jouper et al., 2006). Because of the low level of intensity involved, this movement therapy is also suitable for older adults (Kemp, 2004).

Motivation is crucial to the initiation and maintenance of regularly performed physical exercise. Self-determination theory (Deci and Ryan, 1985) has been used to understand and analyze exercise behavior and in addition to intrinsic and extrinsic motivation, it also includes the concept of amotivation (Deci and Ryan, 2002). People are amotivated when the intention to engage in any behavior, such as exercise, is lacking. Extrinsically motivated people exercise for external rewards, such as public praise, health improvements or because of fear of punishment, or as a reaction to external pressures. Intrinsically motivated people exercise, because it is fun and enjoyable in its own right rather than being driven by outcome goals.

According to the transtheoretical model (TTM) (Prochaska and DiClemente, 1983), the relative strength of intrinsic or extrinsic motives to exercise has been found to change across the *preparation* stage (when the individual is considering exercise as a potential activity), the *action* stage (when exercise has been performed for less than 6 months) and the *maintenance* stage (when exercise has been performed for more than 6 months). Extrinsic motives are stronger in preparation and action stages, whereas intrinsic motives dominate in the maintenance stage (Ingledew et al., 1998). People who start to exercise because of extrinsic motives are less likely to persist with the activity if extrinsic reasons remain the sole motivator (Ryan et al., 1997; Wankel, 1993). This suggests that extrinsic motives (e.g., compliance with prescribed exercise) are important when regular exercise is contemplated, but that long time adherence depends on a shift towards intrinsic motives.

Armitage (2005) showed that baseline exercise intention predicted increased exercise behavior, in line with the theory of planned behavior (TPB) (Ajzen, 1991; Ajzen and Madden, 1986). TPB postulates that the attitude towards a particular behavior (e.g., exercise), subjective norms and perceived control determine whether the individual's intention actually translates to performing the behavior. It can thereby be predicted that individuals scoring high on a measure including these variables will be overrepresented among those that maintain a regular exercise behavior. This hypothesis will be tested.

Perceived stress has, however, been found to reduce both the number of exercise sessions and the time spent exercising each week (King et al., 1997; Stetson et al., 1997). Even if qigong exercise effectively reduces stress-related symptoms (Lee et al., 2004, 2000), feeling stressed before a program is implemented may reduce exercise frequency. High stress and lack of energy is

consistent with the *tense tiredness* state, according to the tense–energy model (TEM) (Thayer, 2001). Tense tiredness is a state where resources are depleted and is frequently associated with feelings of tenseness, anxiousness, or nervousness. This is a state where chronic stress may lead to depression, exhaustion, poor sleep, and general ill-health. Health-professionals frequently prescribe exercise to people trying to recover from a *tense tiredness* state (Thayer, 1996). Recovery then aims towards a *calm energy* state according to TEM. A calm energy state is associated with being engaged in normal daily activities with perfect calmness. Feelings of being in the "zone" or in "flow", without feelings of stress or anxiety, are reported. There is time for activities, which are performed with focused attention, and physical activities are not avoided. This suggests that people in a *calm energy* state adhere more to new activities than those who are in a *tense tiredness* state.

To summarize, little is known about the impact of intrinsic versus extrinsic motivation, intention to exercise, levels of stress and energy as they relate to qigong exercise adherence. Our aim therefore, is to investigate how age, exercise motives, exercise intention, stress, and energy correlate with qigong exercise over time.

Method

Participants

Eighty-seven individuals (6 men and 81 women) with a mean age of 36.5 years (SD 17) were recruited from introductory qigong courses (see Procedure). The average height for the group was 168 cm (men 184 cm, women 167 cm), and their body mass 65 kg (men 81 kg, women 64 kg).

Measures

Background variables

Participants were asked to describe their physical activity habits. If they did perform any regular exercise, they were also asked to describe the type of exercise, the number of sessions per week, session time on average, and number of years they had exercised.

Self-determination

A modified version of the 28-item sport motivation scale (SMS) was used to measure intrinsic, extrinsic, and amotivation (Pelletier et al., 1995). The modification entailed changing "sport" to "exercise" to allow leisure-time exercisers to relate to the questions. The SMS includes seven subscales, each with four items, rated on a scale from 1 (not at all) to 7 (very much). Three of the subscales measure different forms of intrinsic motivation: to know, to accomplish, and to experience stimulation. Three of the subscales measure different forms of regulation for extrinsic motivation: external regulation, introjected regulation, and identified regulation. The final subscale measures amotivation. Cronbach alphas for the seven subscales ranged between .78 and .88.

Planned behavior

Exercise intension was measured with the TPB questionnaire (Francis et al., 2004). Twelve items measured behavior beliefs, rated between 1 (not at all) and 7 (very much), with four items per subscale labeled: attitude, subject norm and behavior control. Internal consistency (Cronbach alphas) for attitude: .81, subject norm .73, and behavior control .60. exercise intention (intended exercise sessions per week) was measured from 0 (sessions per week) to 7 (sessions per week).

Stress and energy

The level of stress and energy was measured by the twelve-item stress–energy scale (Kjellberg and Wadman, 2002), with six items for each subscale. Scores range from 0 (not at all) to 5 (very much). Internal consistency (Cronbach alphas) for stress was .84 and for energy .72. The neutral point has been determined to be 2.4 on the stress subscale and 2.7 on the energy subscale (Kjellberg and Iwanowski, 1989). The instrument has been validated in strain studies (Kjellberg and Bolin, 1974; Kjellberg and Iwanowski, 1989).

Performed exercise

During the study and after completion of the qigong course, respondents were asked to keep an exercise diary detailing the number of qigong sessions performed per week, and their level of concentration on qi-flow and movements during their qigong exercise. The level of concentration was rated on a 10-point Likert-scale ranging from 1 (very low) to 10 (very high).

Procedure

Instructors trained in the Biyun method are organized in Green Dragon, a national association for people who practice Biyun-qigong. General information was sent to the instructors and they were informed about the study and asked if they

were offering any beginner courses in Jichu gong (the first level) and if they could take part in the study. Instructors who responded (from all over Sweden) were sent instructions and questionnaires. Instructors were asked to inform the course participants about the study that all answers were to be treated anonymously, that participation was voluntary and that the results were to be published in a scientific journal.

In the first part of the questionnaire, respondents were informed about the study and its aim, and by continuing they gave their written informed consent. After completing the questionnaire, they were given an exercise diary and asked to detail their qigong exercise habits on a daily basis for 10 weeks after the course completion. After 10 weeks, participants received a stamped, addressed envelope and were asked to send in their exercise diaries. Those who did not comply within a week received a phone call from a research assistant.

Results

Demographic and exercise variables

Of the 87 participants who completed their course requirements, 64 (74%) performed regular qigong exercise with a mean of 2.3 (SD 2.1) sessions per week over the 10 weeks. Their mean level of concentration was 5.9 (SD 1.6), as measured on the 10-point Likert-scale. Besides qigong, the exercisers also performed a number of other physical activities, such as walking, jogging and swimming (72.4%), strength training (5.7%), aerobic, fitness, dancing (5.7%), biking, cross-country skiing (2.3%), and other activities (13.8%). The individuals as a group ($n = 64$) performed these activities 3.8 times a week on average (SD 1.8), for 53 min (SD 23) and had done so for more than 6 months (maintenance stage according to TTM). The exercisers' age ($r = .40$, $p < .001$) and level of concentration ($r = .44$, $p < .001$) were significantly correlated with the number of sessions per week. Specifically, older adults exercised more than younger adults, as did participants with higher concentration levels. No significant correlations with qigong exercise were found between other demographic and exercise variables (Table 1).

Self-determination variables

Mean scores and standard deviations for the 7 self-determination subscales (7 motivation variables), where "7" denote maximum were: (intrinsic motives) to know 3.7 (SD 1.5), to accomplish 4.4 (SD 1.6), and to experience stimulation 4.4 (SD 1.5), (extrinsic motives) external regulation 3.2 (SD 1.3), introjected regulation 5.2 (SD 1.4), identified regulation 2.2 (SD 1.3), and amotivation 1.8 (SD 1.1). Extrinsic introjected regulation motives to exercise was significantly higher than the other motivation variables (t [86] 5.2, $p < .001$), which means that the participants were primarily extrinsically motivated when they signed up for the qigong course. There were no significant correlations between any of the self-determination subscales and exercise sessions per week (all ps. $> .05$).

Planned behavior variables

Mean scores and standard deviations for the four planned behavior variables were: attitude 6.0 (SD 1.1), subject norm 4.8 (SD .9), perceived behavior control 5.3 (SD 1.1), and exercise intention 4.4 (SD 1.5). The strongest correlation was found between exercise intention and exercise sessions per week ($r = .40$, $p < .001$); those with the highest intention performed the most exercise. Exercise intention was also positively correlated with attitude

Table 1 Means, standard deviations (SD), and correlations between exercise sessions, exercise intention, age, stress, energy, and concentration ($n = 87$).

Variables	Mean	SD	1	2	3	4	5	6
1. Exercise sessions	2.3	2.1	–	.37**	.40**	−.22*,†	.04	.44**
2. Exercise intention	4.4	1.5			.06	.07	.13	.12
3. Age	36.5	17				−.07	.12	.35**
4. Stress	2.6	1.0					−.36**	−.16
5. Energy	3.1	0.8						.28*
6. Concentration	5.9	1.6	–					

*$p < .05$.
**$p < .001$.
†One tailed.

($r = .25$, $p < .021$), subject norm ($r = .33$, $p < .004$), and perceived behavior control ($r = .25$, $p < .023$). Attitude, subject norm, and behavior control explain 45% ($R^2 = .45$) of the strength in exercise intention.

Stress–energy variables

Mean scores and standard deviations for the stress and energy variables, where "5" denote maximum, were: stress 2.6 (SD 1.0) and energy 3.1 (SD 0.8). Exercise sessions per week were negatively correlated with stress ($r = -.22$, $p < .03$) one tailed: participants with a lower stress level exercised more often per week than participants with higher stress. Stress correlated negatively with energy ($r = -.36$, $p < .001$), showing that higher stress levels reduce energy. There was no significant correlation between exercise sessions per week and energy.

A one-sample *t*-test was used to compare stress and energy levels with a similar population, and the stress level of the group was significantly higher than the norm, 2.4 (t [86] 2.3, $p < .05$); their energy level was also significantly higher than the norm, 2.7 (t [86] 4.7, $p < .001$) (Kjellberg and Iwanowski, 1989). Dividing participants according to the calm energy and tense tiredness states shows a preliminary descriptive tendency of adherence. Participants belonging to the tense tiredness state ($n = 19$) displayed the lowest level of Qigong adherence: 42% did not exercise at all. Participants belonging to the calm energy state ($n = 33$) adhered to a higher degree to qigong exercise, with 79% exercising after 10 weeks (see Figure 1).

Significant correlations, between stress, age and exercise intention, and exercise sessions per week, were analyzed in a stepwise multiple regression.

High Stress

Low Energy	**Tense tiredness** n = 19 qa 11 [58] na 8 [42]	**Tense energy** n = 29 qa 21 [72] na 8 [28]
	Calm tiredness n = 6 qa 6 [100]	**Calm energy** n = 33 qa 26 [79] na 7 [21]

High Energy

Low Stress

Figure 1 Participants descriptive divided according to their stress and energy levels. Note: qa = qigong adherence, na = no adherence, percentages in brackets.

The analysis revealed that exercise intention ($R^2 = .11$), age ($R^2 = .15$), and stress ($R^2 = .03$) together predict increased number of exercise sessions per week ($R^2 = .29$). If concentration (a non-baseline measure) is included in the regression analysis, exercise intention, age, stress, and concentration increases the strength of the predictions ($R^2 = .38$).

Discussion

The aim of this study was to investigate how age, exercise motives, exercise intentions, stress, and energy levels correlate with qigong exercise over time. Participants ($n = 87$) were mainly motivated to exercise by extrinsic introjected reasons, and they had an exercise intention to practice qigong more than four sessions per week. The results show that only 74% of the participants (64 out of 87) did in fact perform qigong exercise at the end of the 10-week period, and on average only 2.3 times per week. Whether the external focus of the participants can explain the difference between intention and outcome is difficult so conclude with certainty. Previous research has, however, indicated that adherence to a new behavior is lower in individuals that cite external motives, as compared to those driven by internal motives (Thøgersen-Ntoumani and Ntoumanis, 2006), in line with the self-determination theory developed by Deci and Ryan (1985). It is possible that those individuals performing qigong at the end of the 10-week period were more successful in finding intrinsic motives after course conclusion than those that stopped exercising, as indeed is suggested by Buckworth et al. (2008), but this is not possible to determine from the data collected. Considering the fact that the participants as a group, in addition to qigong, performed other physical activities each week, it is also possible that the relatively lower frequency of qigong exercise can be explained by other factors. One such factor is the potentially rewarding effects stemming from mind–body activities, such as expected health improvements, may take longer to perceive when performing qigong than from other more intensive forms of exercise, such as walking or jogging. The relatively short follow-up period of 10 weeks may also explain why intrinsic motives did not correlate with session frequency. This should be investigated in future studies.

As suggested (Kemp, 2004), low-intensity mind–body activities such as qigong may be better suited to the needs and abilities of older adults. Our

results show that age is positively associated with exercise sessions ($r = .40$, $p < .001$). Results cannot establish if a correlation also exists for exercisers older than 65 years as the present sample was middle-aged. Previous research has, however, indicated that qigong exercise is also suitable for people above the age of 65 (Jouper et al., 2006; Kemp, 2004). In contrast, very young healthy individuals may prefer more intense activities, and this may explain the lower exercise frequency in the younger participants in this study (cf. Ryan et al., 1997; Wankel, 1993). Age correlates positively with level of concentration ($r = .35$, $p < .002$), and concentration correlates positively with exercise sessions ($r = .44$, $p < .001$), suggesting that older adults with good concentration skills may find qigong exercise rewarding.

Increased levels of stress reduce qigong Exercise sessions in the same way as was suggested for other types of exercise (King et al., 1997; Stetson et al., 1997), and this confirms the hypothesis that elevated baseline stress reduce qigong exercise. Participants with a higher stress level and lower energy level belong to the tense tiredness state, according to TEM (Thayer, 2001). As evident in Figure 1, individuals in the tense tiredness square adhere less to the new activity than those in the calm energy state (low stress and high energy). Being stressed out obviously affects exercise adherence, as discussed previously (King et al., 1997; Stetson et al., 1997).

Exercise intention at baseline correlates positively with Exercise sessions, and thereby confirm the hypothesis that stronger Exercise intention translates into more exercise actually being performed. This is in line with the Theory of Planned Behavior (Ajzen, 1991; Ajzen and Madden, 1986) and findings by Armitage (2005). Strengthening the attitude towards the behavior, the Subjects' support for the behavior, and the feeling of Behavior control, to secure high Exercise intention and to secure high exercise behavior is beneficial, as also pointed out by Courneya (1995).

In conclusion, exercise intention, age, and stress predict increased number of exercise sessions per week ($R^2 = .29$). When level of concentration is included as a predictor, this increases exercise prediction ($R^2 = .38$). Concentration abilities should, however, be measured at the baseline to increase prediction strength. To enhance adherence and increase exercise frequency, health-professionals may focus on strengthening the individual's intention to exercise, promoting a calm energy state before commencement of exercise, and encouraging a heightened level of concentration during exercise.

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